

### **REMARKS**

The present application includes claims 1-21. Claims 1-21 were rejected by the Examiner. By this amendment, paragraph [0031] has been amended to correct a typographical error and does not introduce any new matter.

Claims 1-21 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Rand (U.S. Patent No. 5,386,445), in view of Findeisen (U.S. Patent No. 3,586,901), and in further view of Matsui et al. (U.S. Patent No. 5,442,183).

The Applicant now turns to the Examiner's rejection of claims 1-21 under 35 U.S.C. §103(a) as being unpatentable over Rand, in view of Findeisen, and in further view of Matsui.

Rand relates to a method and apparatus for scanning electron beam computed tomographic X-ray systems. More specifically, Rand addresses focusing an electron beam by electrostatically controlling the distribution of beam-generated ions (col. 2, lines 44-46). With reference to FIGS. 2 & 3, Rand uses a positive ion electrode ("PIE") 48 to prevent positive ions from migrating upstream (col. 4, lines 23-25). Such upstream migration would interfere with the creation of a sharply self-focused electron beam spot (col. 4, lines 25-27). In addition, while the presence of positive ions is beneficial in the downstream, self-focusing region 36, they must be removed in the upstream, self-expanding defocusing region 34 (col. 3, lines 65-68). Rand uses a periodic ion clearing electrode ("PICE") 52 to remove positive ions from the upstream region (col. 4, lines 39-42).

Findeisen relates to an electron gun for use in a contaminated environment. More specifically, Findeisen is directed to a means for reducing the rate at which positive ions bombard electron gun cathodes and the rate at which residue builds up around apertures of electron guns (col. 1, lines 56-59). As illustrated in FIG. 1, Findeisen uses a first anode 30 at a higher potential than a second anode 14, resulting in a “potential hill” that must be overcome by positive ions in order to be attracted to the cathode 23 (col. 5, lines 6-12). Thus, most of the positive ions that could reach the cathode are prevented from doing so because they lack the kinetic energy to overcome the “potential hill” and therefore the number of positive ions striking the cathode is reduced (col. 5, lines 14-30). In addition, Findeisen uses a shroud 16 that protrudes through an opening 17 in the glass envelope 18 to provide a constant electric field for the electrons in the beam to pass into the light valve, preventing any electric fields built up on the surface of the glass envelope 18 from perturbing the path of the electron beam (col. 4, lines 56-61).

Matsui relates to a charged particle beam apparatus that uses an electrostatic lens for finely focusing the charged particle beam (col. 1, lines 16-19). As shown in FIG. 12, the electron beam is focused by the focusing electron optical system comprising the final electrode 7, the first lens electrode 6, the second lens electrode 5, a cylindrical electrode 66, a deflecting space forming electrode 67, an insulating cylinder 68, a coil unit 69, and other related components (col. 15, lines 22-30). This arrangement allows the beam column to be significantly reduced in size (col. 15, lines 47-50). The electron beam is focused by two kinds of electrostatic lens action (col. 16, lines 12-15). The first action is provided by the electric field formed between the opening of the upper surface center of the cylindrical electrode 66 and the central opening of the second electrode 5 (col. 16,

lines 15-19). The second action is provided by the electric field produced between the first lens electrode 6 and the central opening of the final lens electrode 7 (col. 16, lines 19-22). The lens electric field formed between the first lens electrode 6 and the final lens electrode 7 works as an electrostatic objective lens (col. 16, lines 32-34). Thus, the sample can be observed with sufficiently high resolution at low acceleration voltages (col. 16, lines 40-41). Because the final electrode 7 is connected to ground potential, the electrostatic objective lens is immune to disturbances emanating from the lens electric field, allowing secondary electrons to be efficiently detected (col. 16, lines 46-51).

The claimed invention relates to spherical aberration correction in a diagnostic imaging system. More specifically, the claimed invention focuses on correcting spherical aberration of an electron beam with an extended range of correction. As described above, Rand does not teach or suggest the limitations of claims 1-21. For example, as correctly indicated by the Examiner, Rand does not teach or suggest a grounded tube downstream of an ion trap as recited in claims 1-21. As an additional example, Rand does not teach or suggest altering spherical aberration correction as recited in claims 1-21. Rather, a grounded tube or similar system for altering spherical aberration correction is simply not found in Rand.

Findeisen, as described above, likewise does not teach or suggest the limitations of claims 1-21. For example, Findeisen does not teach or suggest a grounded tube downstream of an ion trap as recited in claims 1-21, nor does Findeisen teach or suggest altering spherical aberration correction as recited in claims 1-21. Rather, Findeisen uses a first anode at a higher potential than a second anode to create a “potential hill” to prevent positive ions from striking the cathode. Further, Findeisen uses a shroud to

prevent electric fields built up on the surface of a glass envelope from perturbing the path of the electron beam. A grounded tube or similar system or method for altering spherical aberration correction is simply not found in Findeisen.

The Applicant respectfully traverses the Examiner's assertion that the shroud of Findeisen is equivalent to the grounded tube recited in claims 1-21 of the present application. In addition, the Applicant respectfully traverses the Examiner's assertion that it would have been obvious to one of ordinary skill in the art that the CT scanning system of Rand could be modified to use a conductive tube downstream from an ion trap in accordance with Findeisen to provide a constant electric field, thereby reducing perturbations of the electron beam path. Neither Rand nor Findeisen teach or suggest such a combination, nor has any motivation to combine been suggested. If the Examiner is asserting Official Notice that the subjects of these statements are common knowledge, the Applicant respectfully traverses the Examiner's assertions as further set forth below. Alternatively, if the Examiner's assertions are based on the personal knowledge of the Examiner, then under MPEP § 2144.03(C) and 37 C.F.R. § 1.104(d)(2), the Examiner's assertions must be supported by an affidavit from the Examiner. According to MPEP § 2144.03(A), Official Notice, without supporting references, should only be asserted when the subjects asserted to be common knowledge are "capable of instant and unquestionable demonstration as being well-known." That is, the subjects asserted must be of "notorious character" under MPEP § 2144.03(A). The Applicant respectfully submits that the subject matter of the Examiner's assertions of Official Notice are not well-known in the art as evidenced by the searched and cited prior art. The Applicant respectfully submits

that the Examiner has performed “a thorough search of the prior art,” as part of the Examiner’s obligation in examining the present application under MPEP § 904.02.

Additionally, the Applicant respectfully submits that the Examiner’s searched and cited references found during the Examiner’s thorough and detailed search of the prior art are indicative of the knowledge commonly held in the art. However, in the Examiner’s thorough and detailed search of the relevant prior art, none of the prior art taught or suggested the subject matter of the Examiner’s assertions of Official Notice. That is, the Examiner’s thorough and detailed search of the prior art has failed to yield any mention of the teachings that the Examiner is asserting as widely known in the art. The Applicant respectfully submits that if the subject matter of the Examiner’s assertions of Official Notice had been of “notorious character” and “capable of instant and unquestionable demonstration as being well-known” under MPEP § 2144.03(A), then the subject matter would have appeared to the Examiner during the Examiner’s thorough and detailed search of the prior art.

If the Examiner had found any teaching of relevant subject matter, the Examiner would have been obligated to list the references teaching the relevant subject matter and make a rejection. Consequently, the Applicant respectfully submits that the prior art does not teach the subject matter of the Examiner’s assertions of Official Notice and respectfully traverses the Examiner’s assertions of Official Notice.

As discussed above, Matsui does not teach or suggest the limitations recited in claims 1-21. For example, Matsui does not teach or suggest a grounded tube downstream of an ion trap as recited in claims 1-21, nor does Matsui teach or suggest altering spherical aberration correction as recited in claims 1-21. Rather, Matsui uses an

electrostatic lens to focus a charged particle beam. The final electrode in Matsui is part of a focusing electron optical system and acts as an electrostatic objective lens. No grounded tube or similar system or method for altering spherical aberration correction is taught or suggested by Matsui. Thus, neither alone nor in combination with Rand and Findeisen, does Matsui teach or suggest the limitations recited in claims 1-21. Further, Matsui does not teach or suggest such a combination, nor does Matsui include any motivation to combine the three references been suggested.

Regarding claims 2, 4, 9, 11, 13, and 17-21, the Applicant respectfully traverses the Examiner's assertion that it would have been obvious to one having ordinary skill in the art at the time of the invention to adjust the trap aperture size and the grounded tube radius. The Examiner correctly points out that Matsui, with reference to FIG. 5(B), shows the result of computations on a chromatic aberration coefficient  $C_c$  and a spherical aberration coefficient  $C_s$  in effect when the electron beam is focused using the electrostatic lens comprising the electrodes 5, 6, and 7 of FIG. 5(A) (col. 6, lines 49-58). However, Matsui, alone or in combination with Rand or Findeisen, does not teach or suggest any adjustment of the aperture in the ion trap to adjust the range of spherical aberration correction of the ion trap as recited in claims 2, 11, 17, and 21 (the Applicant assumes that the Examiner intended to reference claim 20 rather than claim 21 in this context). In addition, Matsui, alone or in combination with Rand or Findeisen, does not teach or suggest any adjustment of the radius and position of the grounded tube to adjust the range of spherical aberration correction, as recited in claims 4, 9, 13, and 17-20 (the Applicant assumes that the Examiner intended to reference claim 21 rather than claim 20 in this context).

As just mentioned, the Examiner has asserted that it would have been obvious to one having ordinary skill in the art at the time of the invention to adjust the trap aperture size and the grounded tube radius. If the Examiner is asserting Official Notice that the subject of this statement is common knowledge, the Applicant respectfully traverses the Examiner's assertion as further set forth below. Alternatively, if the Examiner's assertion is based on the personal knowledge of the Examiner, then under MPEP § 2144.03(C) and 37 C.F.R. § 1.104(d)(2), the Examiner's assertion must be supported by an affidavit from the Examiner.

According to MPEP § 2144.03(A), Official Notice, without supporting references, should only be asserted when the subjects asserted to be common knowledge are "capable of instant and unquestionable demonstration as being well-known." That is, the subjects asserted must be of "notorious character" under MPEP § 2144.03(A).

However, the Applicant respectfully submits that the subject matter of the Examiner's assertion of Official Notice is not well-known in the art as evidenced by the searched and cited prior art. The Applicant respectfully submits that the Examiner has performed "a thorough search of the prior art," as part of the Examiner's obligation in examining the present application under MPEP § 904.02.

Additionally, the Applicant respectfully submits that the Examiner's searched and cited references found during the Examiner's thorough and detailed search of the prior art are indicative of the knowledge commonly held in the art. However, in the Examiner's thorough and detailed search of the relevant prior art, none of the prior art taught or suggested the subject matter of the Examiner's assertion of Official Notice. That is, the Examiner's thorough and detailed search of the prior art has failed to yield any mention

of the teachings that the Examiner is asserting as widely known in the art. The Applicant respectfully submits that if the subject matter of the Examiner's assertion of Official Notice had been of "notorious character" and "capable of instant and unquestionable demonstration as being well-known" under MPEP § 2144.03(A), then the subject matter would have appeared to the Examiner during the Examiner's thorough and detailed search of the prior art.

If the Examiner had found any teaching of relevant subject matter, the Examiner would have been obligated to list the references teaching the relevant subject matter and make a rejection. Consequently, the Applicant respectfully submits that the prior art does not teach the subject matter of the Examiner's assertion of Official Notice and respectfully traverses the Examiner's assertion of Official Notice.

The elements discussed in the preceding remarks and other elements represent novel improvements over the prior art that are claimed in the present application. A combination of Matsui and Findeisen with Rand would neither teach nor suggest the limitations of the claimed invention, such as those recited above. Therefore, the Applicant respectfully submits that claims 1-21 should be allowable.

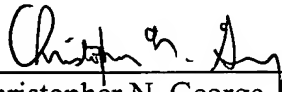


### CONCLUSION

Accordingly, the application is now believed to be in condition for allowance and an action to this effect is respectfully requested. If the Examiner has any questions or the Applicant can be of any assistance, the Examiner is invited and encouraged to contact the Applicant at the number below. Please charge any additional fees or credit overpayment to the Deposit Account of GTC, Account No. 070845.

Respectfully submitted,

Date: June 24, 2004

  
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